What Is Claimed Is:

1. A method for implementing extensible network-attached secondary storage operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storage apparatus, said method comprising the steps of:

executing one or more of application programs on said first computer;

providing said secondary storage apparatus with storage medium (secondary storage) that can save data after shutting down of power source, said secondary storage including a plurality of storage units (blocks) for storing one or more of application data (object) used by said application programs, said secondary storage apparatus providing said first computer with block-based I/O function and object-based I/O function;

receiving a program module (object access module) that implements the object-based I/O function by using the block-based I/O function from the first computer or a second computer different from the first computer; and

receiving object-based I/O request for said object from said first computer to perform object-based I/O of the request by executing said object access module.

2. A method for implementing extensible network-attached secondary storage according to claim 1, wherein:

said object access module obtains the data value or location of data in the block corresponding to a specification, which is either object, object offset, object offset size, or object tag (specifying the type of data to be retrieved).

3. A method for implementing extensible network-attached secondary storage operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storages, said method comprising the steps of:

executing one or more of application programs on said first computer;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks);

storing one or more of application data (object) used by said application programs on said secondary storage; and

registering or deleting to/from said secondary storage apparatus a program module (object access module) that implements object-based I/O function by using block-based I/O function.

4. A first computer according to claim 3, wherein:

said object access module obtains the data value or location of data in the block corresponding to a specification, which is either object, object offset, object offset size, or

object tag (specifying the type of data to be retrieved).

5. An object access module operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storages, said object access module comprising:

said first computer executing one or more of application programs;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, said secondary storage including a plurality of storage units (blocks), said secondary storage storing one or more of application data (object) used by said application programs;

said secondary storage apparatus providing said first computer with block-based I/O function and object-based I/O function;

said object access module implementing object-based I/O function using block-based I/O function;

said object access module sent from said first computer or a second computer different from said first computer to said secondary storage apparatus to execute therein.

6. An object access module according to claim 5, wherein:

said object access module obtains the data value or location of data in the block corresponding to a specification,

which is either object, object offset, object offset size, or object tag (specifying the type of data to be retrieved).

7. A method for implementing extensible network-attached secondary storage, operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storages, said method comprising the step of:

executing one or more of application programs on said first computer;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, said secondary storage including a plurality of storage units (blocks);

storing on said secondary storage one or more of application data (object) used by said application programs;

providing for said first computer block-based I/O function and object-based I/O function from said secondary storage;

receiving from either the first computer or a second computer different from the first computer data indicating how said object is stored on said secondary storage (object description data);

receiving a request of object-based I/O on said object from said first computer to perform I/O of said request by identifying the location of said object on said secondary storage by using said object description data.

8. A method for implementing extensible network-attached secondary storage according to claim 7, wherein:

said object description data is data for specifying attribute or inter-block reference based on the offset and size thereof.

9. A method for implementing extensible network-attached secondary storage according to claim 7, wherein:

said object description data is data for specifying attribute or inter-block reference by a lexical analyzing program (parser) or a parser generating grammar.

10. A method for implementing extensible network-attached secondary storage according to claim 7, wherein:

said object description data is data for specifying the file format of said object based on whether the data stored in a specific part of one or more blocks contains some specific value or pattern.

11. A computer operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storages, said computer comprising:

said first computer executing one or more of application programs;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality

of storage units (blocks), said secondary storage storing one or more of application data (object) used by said application programs;

said computer registering to or deleting from said secondary storage apparatus data indicating how said object is stored on said secondary storage (object description data); and

said secondary storage providing block-based I/O function and object-based I/O function.

12. A computer according to claim 11, wherein:

said object description data is data for specifying the data sequence or inter-block reference of data in a block based on the offset and size thereof.

13. A computer according to claim 11, wherein:

said object description data is data for specifying attribute or inter-block reference of data in a block by a lexical analyzing program (parser) or a parser generating grammar.

14. A computer according to claim 11, wherein:

said object description data is data for specifying the file format of said object based on whether the data stored in a specific part of one or more blocks contains some specific value or pattern.

15. A method for implementing extensible network-attached secondary storage, wherein:

said object access module obtains from the object

description data according to claim 7 through claim 14 a method of storing objects in a secondary storage.

16. A first computer according to claim 3, wherein:

said object access module obtains from the object description data according to claim 7 through claim 14 a method of storing objects in a secondary storage.

17. An object access module according to claim 5, wherein:

said object access module obtains from the object description data according to claim 7 through claim 14 a method of storing objects in a secondary storage.

18. A method for implementing extensible network-attached secondary storage, operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storage apparatus, said method comprising the step of:

executing one or more of application programs on said first computer;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, said secondary storage including a plurality of storage units (blocks);

storing one or more of application data (object) used by said application programs on said secondary storage;

said secondary storage being a secondary storage of a

computer system for providing block-based I/O function and I/O function for application programs (advanced I/O) to said first computer, said secondary storage maintaining object access modules for implementing object-based I/O function by using block-based I/O function, said secondary storage receiving a module for implementing said advanced I/O function by using said object access module (function module) from said first computer or a second computer different from said first computer, then said secondary storage receiving a request for said advanced I/O from said first computer to perform I/O of said request by executing said function module.

19. A computer operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storages, said computer comprising:

said first computer executing one or more of application programs;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks), said secondary storage storing in one or more of blocks one or more of application data (object) used by said application programs;

said secondary storage apparatus operating as said first computer or said second computer different from said first

computer running within a computer system for providing to said first computer a block-based I/O function and an I/O function for said application programs (advanced I/O);

said secondary storage apparatus storing a module that implements object-based I/O function by using block-based I/O function (object access module);

said computer registering to or deleting from said secondary storage a module that implements said advanced I/O by using said object access module (function module).

20. A program module operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storages, said program module comprising:

said first computer executing one or more of application programs;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks), said secondary storage storing in one or more of blocks one or more of application data (object) used by said application programs;

said secondary storage apparatus providing said first computer with a block-based I/O function and an I/O function for said application programs (advanced I/O);

said program module being sent from said first computer

or a second computer different from said first computer to said secondary storage apparatus to be executed on said secondary storage apparatus;

said program module providing said advanced I/O by using a module (object access module) that implements object-based I/O function by using block-based I/O function.

21. A secondary storage apparatus and a protection module thereon, operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storages, said apparatus comprising:

said first computer executing one or more of application programs;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks), said secondary storage storing in one or more of blocks one or more of application data (object) used by said application programs;

said secondary storage apparatus providing to said first computer a block-based I/O function and an I/O function for said application programs (advanced I/O);

said secondary storage apparatus maintaining a module that implements object-based I/O function by using block-based I/O function (object access module), as well as a module that

implements said advanced I/O by using said object access module (function module);

said protection module determining a method invocation to be allowed or denied when said function module attempts to invoke a method in the object access module.

22. A protection module according to claim 21, wherein:

said protection module is registered to or deleted from said secondary storage apparatus by said first computer or a second computer different from said first computer running within said computer system.

23. A method for implementing extensible network-attached secondary storage, operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storage apparatus, said method comprising the step of:

said first computer executing one or more of application programs;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks), said secondary storage storing in one or more of blocks one or more of application data (object) used by said application programs;

said secondary storage apparatus providing said first

computer with a block-based I/O function and an I/O function for said application programs (advanced I/O);

said secondary storage apparatus maintaining an object access module that implements object-based I/O function by using block-based I/O function, as well as a module that implements said advanced I/O by using said object access module (function module);

said module (protection module) for determining whether a method invocation is allowed or denied when said function module attempts to invoke a method in the object access module being received from said first computer or a second computer different from said first computer.

24. A computer operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storage apparatus, said computer comprising:

said first computer executing one or more of application programs;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks), said secondary storage storing in one or more of blocks one or more of application data (object) used by said application programs;

said secondary storage apparatus operating as said first

computer or said second computer different from said first computer running within a computer system for providing to said first computer a block-based I/O function and an I/O function for said application programs (advanced I/O);

said secondary storage apparatus storing an object access module that implements object-based I/O function by using block-based I/O function, as well as a module that implements said advanced I/O by using said object access module (function module);

said computer registering to or deleting from said secondary storage apparatus said protection module for determining a method invocation to be allowed or denied when said function module attempts to invoke a method in the object access module.

25. A locking module on a secondary storage apparatus operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storage apparatus, said module comprising:

said first computer executing one or more of application programs;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks), said secondary storage storing in

one or more of blocks one or more of application data (object) used by said application programs;

said secondary storage apparatus providing said first computer with a block-based I/O function and an I/O function for said application programs (advanced I/O);

said secondary storage apparatus storing an object access module that implements object-based I/O function by using block-based I/O function;

when said object access module provides external devices a plurality of objects having containment, said locking module providing external devices with mutual exclusion function with the containment of said a plurality of objects being taken into consideration.

26. A locking module according to claim 25, wherein:

said locking module is registered to or deleted from said secondary storage apparatus by said first computer or a second computer different from said first computer.

27. A method for implementing extensible network-attached secondary storage, operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storage apparatus, said method comprising the step of:

executing on said first computer one or more of application programs ;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks), said secondary storage storing in one or more of blocks one or more of application data (object) used by said application programs;

providing from said secondary storage apparatus to said first computer with a block-based I/O function and an I/O function for said application programs (advanced I/O);

maintaining on said secondary storage apparatus an object access module that implements object-based I/O function by using block-based I/O function;

receiving locking module from said first computer or a second computer different from said first computer; when said object access module provides external devices a plurality of objects having containment, said locking module for providing external devices with mutual exclusion function with the containment of said a plurality of objects being taken into consideration.

28. A computer operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storage apparatus, said computer comprising:

said first computer executing one or more of application programs;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks), said secondary storage storing in one or more of blocks one or more of application data (object) used by said application programs;

said secondary storage apparatus operating as said first computer or said second computer different from said first computer running within a computer system for providing to said first computer a block-based I/O function and an I/O function for said application programs (advanced I/O);

said secondary storage apparatus storing an object access module that implements object-based I/O function by using block-based I/O function;

when said object access module provides external devices a plurality of objects having containment, said computer registering to or deleting from said secondary storage apparatus said locking module for providing external devices with mutual exclusion function with the containment of said plural objects being taken into consideration.

29. A management computer operable with one or more of first computers, one or more of secondary storage apparatus, one second computer (a management computer), and a network or I/O cable for connecting said first computers and said second computer with said secondary storage apparatus, said management

computer comprising:

said first computer executing one or more of application programs;

said second computer storing the list of said secondary storage apparatus;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks);

said secondary storage apparatus provides said first computer with block-based I/O function and I/O function for said application programs (advanced I/O) or object-based I/O function;

said first computer sending to said second computer a protection module (module) that implements said advanced I/O;

said second computer receiving said module to send it to part or all of said secondary storage apparatus listed on the list;

said secondary storage apparatus receiving said module;

said first computer transmitting to said secondary storage apparatus a request of said advanced I/O;

said secondary storage apparatus invoking said module to perform said advanced I/O.

30. A management computer according to claim 29, wherein:

said management computer provides a compiler for compiling

said protection module for said secondary storage apparatus to compile said module received from said first computer using said compiler in order to send a compiled module to part or all of said secondary storage apparatus.

31. A management computer according to claim 30, wherein:

said management computer storing model data of said secondary storage apparatus, provides one or more compilers for compiling modules for each model of said secondary storage apparatus, to compile said module received from said first computer using said one or more compilers for the destination secondary storage apparatus, to send a compiled module to part or all of said secondary storage apparatus.

32. A method for implementing extensible network-attached secondary storage, operable with one or more of first computers, one or more of secondary storage apparatus, one second computer (a management computer), and a network or I/O cable for connecting said first computers and said second computer with said secondary storage apparatus, said management computer comprising:

said first computer executing one or more of application programs;

said second computer storing the list of said secondary storage apparatus;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of

power source, and said secondary storage including a plurality of storage units (blocks);

said secondary storage apparatus provides said first computer with block-based I/O function and I/O function for said application programs (advanced I/O) or object-based I/O function;

said first computer sending to said second computer a protection module (module) that implements said advanced I/O;

said second computer receiving said module to send it to part or all of said secondary storage apparatus listed on the list;

said secondary storage apparatus receiving said module;

said first computer transmitting to said secondary storage apparatus a request of said advanced I/O;

said secondary storage apparatus invoking said module to perform said advanced I/O.

33. A method for implementing extensible network-attached secondary storage, operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storage apparatus, said method comprising the step of:

executing on said first computer one or more of application programs;

said secondary storage apparatus including storage medium

(secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks), said secondary storage storing in one or more of blocks one or more of application data (object) used by said application programs;

providing from said secondary storage apparatus to said first computer with a block-based I/O function and an I/O function for said application programs (advanced I/O) or object-based I/O function;

receiving a protection module (object access module) that implements said object-based I/O function or said advanced I/O by using block-based I/O function from said first computer or a second computer different from said first computer;

providing said secondary storage apparatus with a compiler for compiling said module into an executable for faster execution;

compiling said module using said compiler on said secondary storage apparatus;

receiving a request of object-based I/O or advanced I/O on said object from said first computer; and

performing I/O of said request by executing said compiled module.

34. A method for implementing extensible network-attached secondary storage, operable with one or more of first computers, one or more of secondary storage apparatus, and a

network or I/O cable for connecting said first computers with said secondary storage apparatus, said method comprising the step of:

executing on said first computer one or more of application programs;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks), said secondary storage storing in one or more of blocks one or more of application data (object) used by said application programs;

providing from said secondary storage apparatus to said first computer with a block-based I/O function and an I/O function for said application programs (advanced I/O);

for said advanced I/O function, providing a feature of replying, in response to a request from said first computer, a correspondence between a plurality of part of one object and secondary storage apparatus for storing said part of object.

35. An apparatus for implementing extensible network-attached secondary storage, operable with one or more of first computers, one or more of secondary storage apparatus, and a network or I/O cable for connecting said first computers with said secondary storage apparatus, said apparatus comprising:

said first computer executing one or more of application programs;

said secondary storage apparatus including storage medium (secondary storage) that can save data after shutting down of power source, and said secondary storage including a plurality of storage units (blocks), said secondary storage storing in one or more of blocks one or more of application data (object) used by said application programs;

means for providing said first computer block-based I/O function and object-based I/O function;

means for receiving a program module (object access module) that implements object-based I/O function by using block-based I/O function from said first computer or a second computer different from said first computer;

means for receiving said object access module and for receiving a request of object-based I/O on said object access module from said first computer; and

means for executing said object access module.